

Amendments

In the Claims

SUB E1
1. (Thrice Amended) An apparatus for guiding the movement of a surgical tool in relation to the anatomy of a patient, the apparatus comprising:

display means disposed remote from the tool for indicating to a human the difference between the actual and desired positions of the tool, the display means having a display reference frame; and

means for determining an actual position of the display means, wherein the difference is indicated with respect to the display reference frame.

3. (Twice Amended) An apparatus for use with an image guided surgical system which system includes a first display disposed remote from a surgical tool for indicating a position of the surgical tool in relation to an image of the anatomy of a patient, the apparatus comprising:

SUB E2
a surgical tool having a tool reference frame;

means adapted for operative communication with the image guided surgery system and mounted to the tool for indicating to a human the difference between the actual and desired positions of the tool; and

means for determining an actual position of the means for indicating.

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4. (Twice Amended) The apparatus of claim [1] 3 wherein the [display] means for indicating comprises at least one indicator, the indicator indicating a direction in which the tool should be moved to reach the desired position.

SUB E3
6. (Twice Amended) [The apparatus of claim 3] An apparatus comprising:
a surgical tool having a tool reference frame;

means mounted to the tool for indicating to a human the difference between the actual and desired positions of the tool; and

means for determining an actual position of the means for indicating, wherein the tool includes proximal and a distal ends and the [display] means for indicating comprises a plurality of selectively operable human visible indicators for indicating a direction in which the distal end should be translated to each the desired position, said plurality of position indicators disposed at angular intervals so as to surround a central point.

15. (Amended) [The apparatus of claim 1] An apparatus for guiding the movement of a surgical tool in relation to the anatomy of a patient, the apparatus comprising:

display means for indicating to a human the difference between the actual and desired positions of the tool; and

means for determining an actual position of the display means, wherein the tool comprises a pointing axis and the means for indicating comprises at least two indicators mounted in a plane substantially orthogonal to the pointing axis.

17. (Thrice Amended) An apparatus for use with an image guided surgery system which system includes a first display disposed remote from a surgical tool for indicating a position of the surgical tool in relation to an image of the anatomy of a patient, the apparatus comprising:

a surgical tool having a tool reference frame;

means for communicating an actual position of the tool to the image guided surgery system;

at least one position indicator mounted to the tool, the at least one indicator providing to a human operator an indication of the direction in which the tool should be moved to reach a desired position.

22. (Amended) [The apparatus of claim 17 further comprising] An apparatus for use with an image guided surgery system, the apparatus comprising:

a surgical tool having a tool reference frame;

means for communicating an actual position of the tool to the image guided surgery system;

first and second position indicators mounted to the tool and arranged along a first line and third and fourth position indicators mounted to the tool and arranged along a second line, the first and second lines being perpendicular, the indicators providing to a human operator an indication of the direction in which the tool should be moved to reach a desired position.

24. (Amended) An apparatus for guiding the movement of a surgical tool with respect to the anatomy of a patient, the apparatus comprising:

a surgical tool;

means for defining a desired position of the tool based on an image of the anatomy;

means for determining the actual position of the tool;

means for determining the difference between the actual and desired positions;

a display disposed remote from the surgical tool for indicating a position of the surgical tool in relation to an image of the anatomy of the patient;

at least one indicator mounted to the tool, the indicator providing an indication of the difference between the actual and desired positions.

25. (Thrice Amended) An apparatus for use with an image guided surgical system which system includes an infrared localizer and a first display disposed remote from a surgical tool for indicating a position of the surgical tool in relation to an image of the anatomy of a patient, the apparatus comprising:

a surgical tool;

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E₁ (cont.)
a plurality of infrared emitters mounted to the tool for providing position signals to [an] the infrared localizer; and

at least one human readable position indicator mounted to the tool.

26. (Twice Amended) A method for guiding the movement of a surgical tool with respect to the anatomy of a patient having patient reference frame, the method comprising the steps of:

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determining a desired position of the tool based on an image of the anatomy of the patient, the image having an image reference frame:

correlating the image and patient reference frames;

determining ^{an} the actual position of the tool;

determining a direction in which the tool must be moved to reach the desired position;

determining an actual position of a human readable position display disposed remote from the tool having a display reference frame; and

utilizing the human readable position display to indicate the direction in which the tool must be moved to reach the desired position, said indicating being provided in relation to the indicator reference frame.

27. (Thrice amended) A method for guiding the movement of a surgical tool with respect to the anatomy of a patient having a patient reference frame, the method comprising the steps of:

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displaying an image of the anatomy of the patient on a display disposed remote from the surgical tool;

determining a desired position of the tool based on [an] the displayed image [of the anatomy of a patient, the image having an image reference frame];

determining a direction the tool must be moved to reach the desired position;

determining an actual position of a position indicator having an indicator reference frame, wherein the position indicator is mounted to the tool and the step of determining an actual position of the position indicator includes determining an actual position of the tool; and

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utilizing the position indicator to indicate to a human the direction in which the tool must be moved to reach the desired position, said indication being provided in relation to the indicator reference frame.

30. (Thrice amended) A method for guiding the movement of a surgical tool with respect to the anatomy of a patient having a patient reference frame, the method comprising the steps of:

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displaying an image of the anatomy of the patient on a display disposed remote from the surgical tool;

determining a desired position of the tool based on [an] the displayed image [of the anatomy of a patient], the image having an image reference frame;

determining a direction the tool must be moved to reach the desired position;

determining an actual position of a position indicator having an indicator reference frame, wherein the position indicator is mounted to the tool and the position indicator comprises at least one indicator for indicating a direction in which the tool must be moved to reach a desired location and at least one indicator for indicating a direction in which the tool must be moved to reach a desired orientation; and

utilizing the position indicator to indicate to a human the direction in which the tool must be moved to reach the desired position, said indication being provided in relation to the indicator reference frame.